Hot spots in the ice: importance of polynyas for Antarctic marine ecosystems

NASA BDEC Team Meeting – May 8, 2023

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Photo: John Weller

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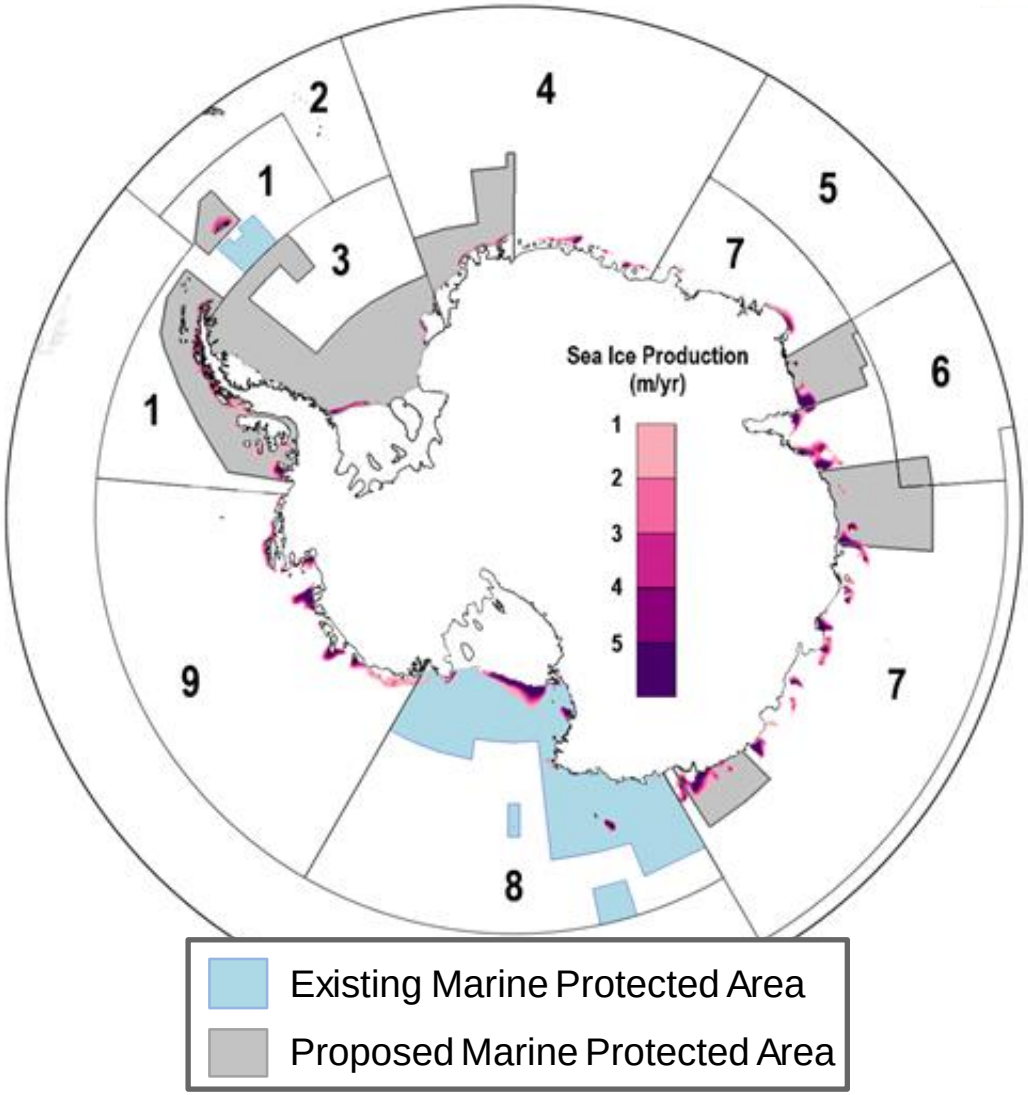
Project Goal:

Provide information about the conservation value of polynyas in different Antarctic regions over policy relevant timescales.



End users span the Science-Policy-Public Interface

End Users

THE PEW CHARITABLE TRUSTS

Antarctic and Southern Ocean Coalition

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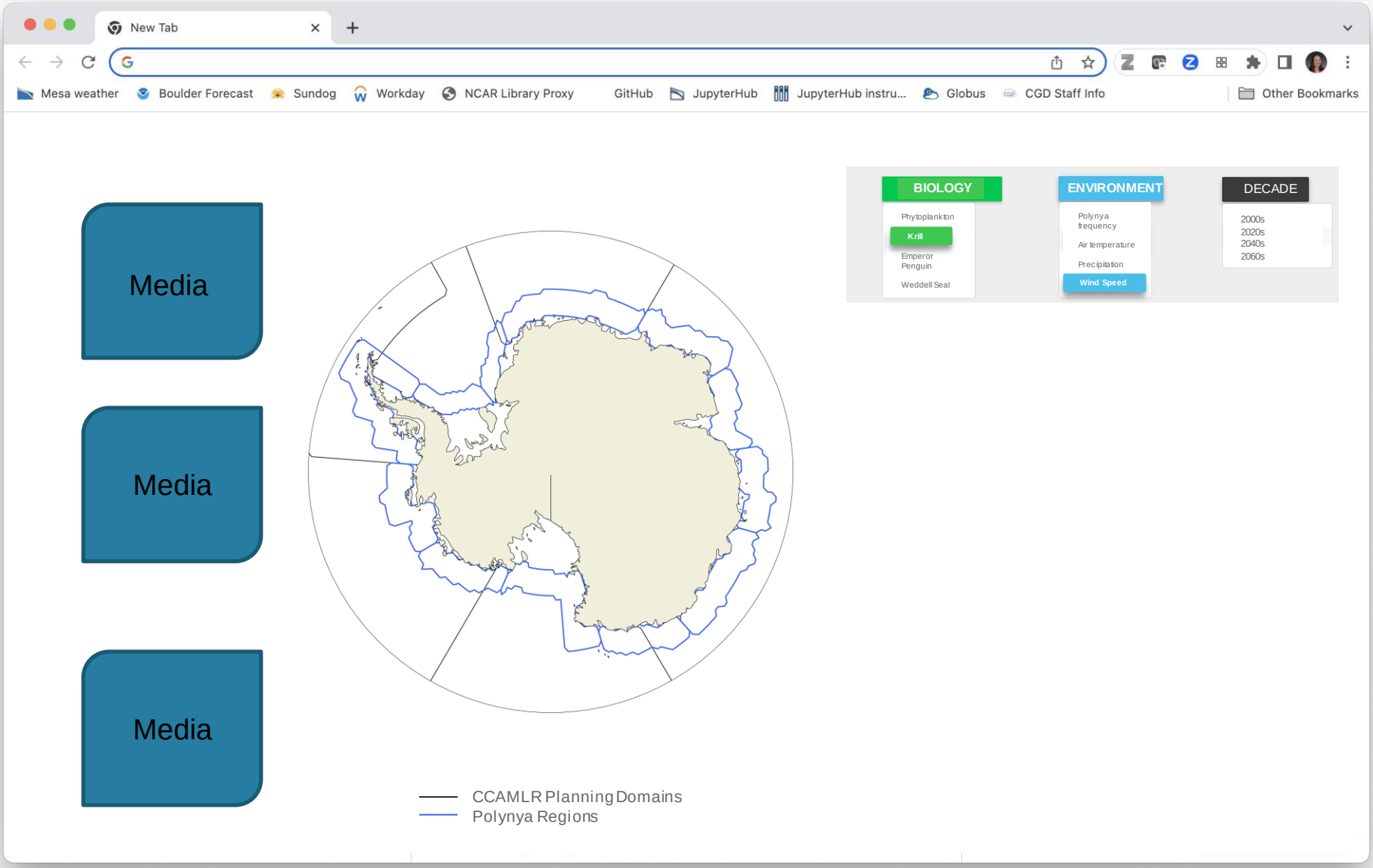
CCAMLR

(Commission for the Conservation of Antarctic Marine Living Resources)

The general public

Building a tool with information on changing ecosystem and environment



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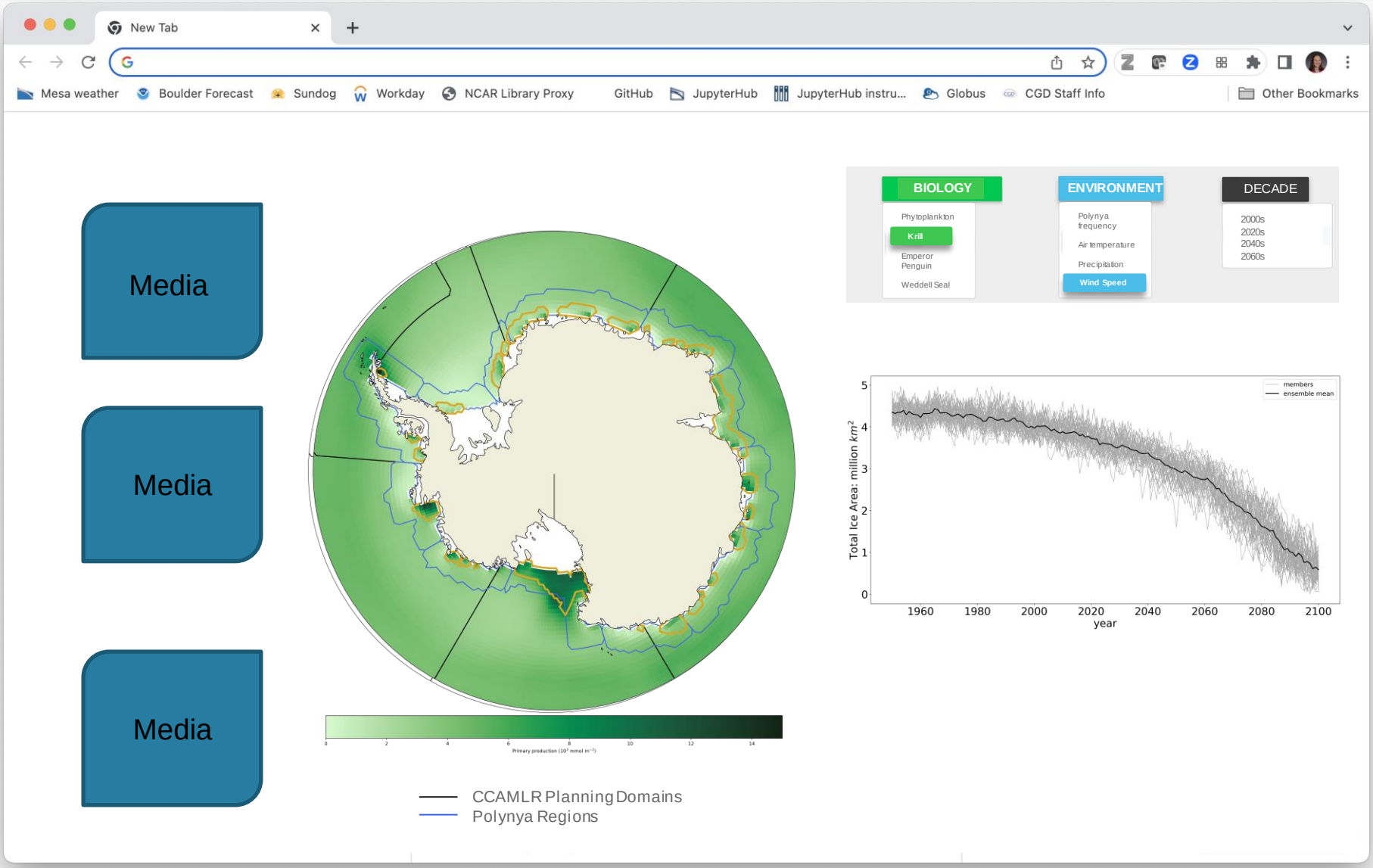

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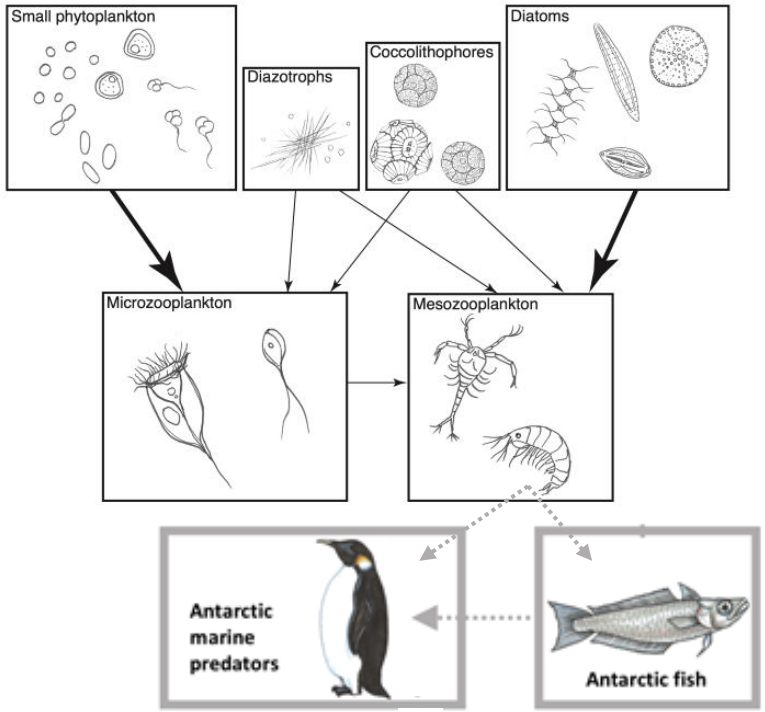
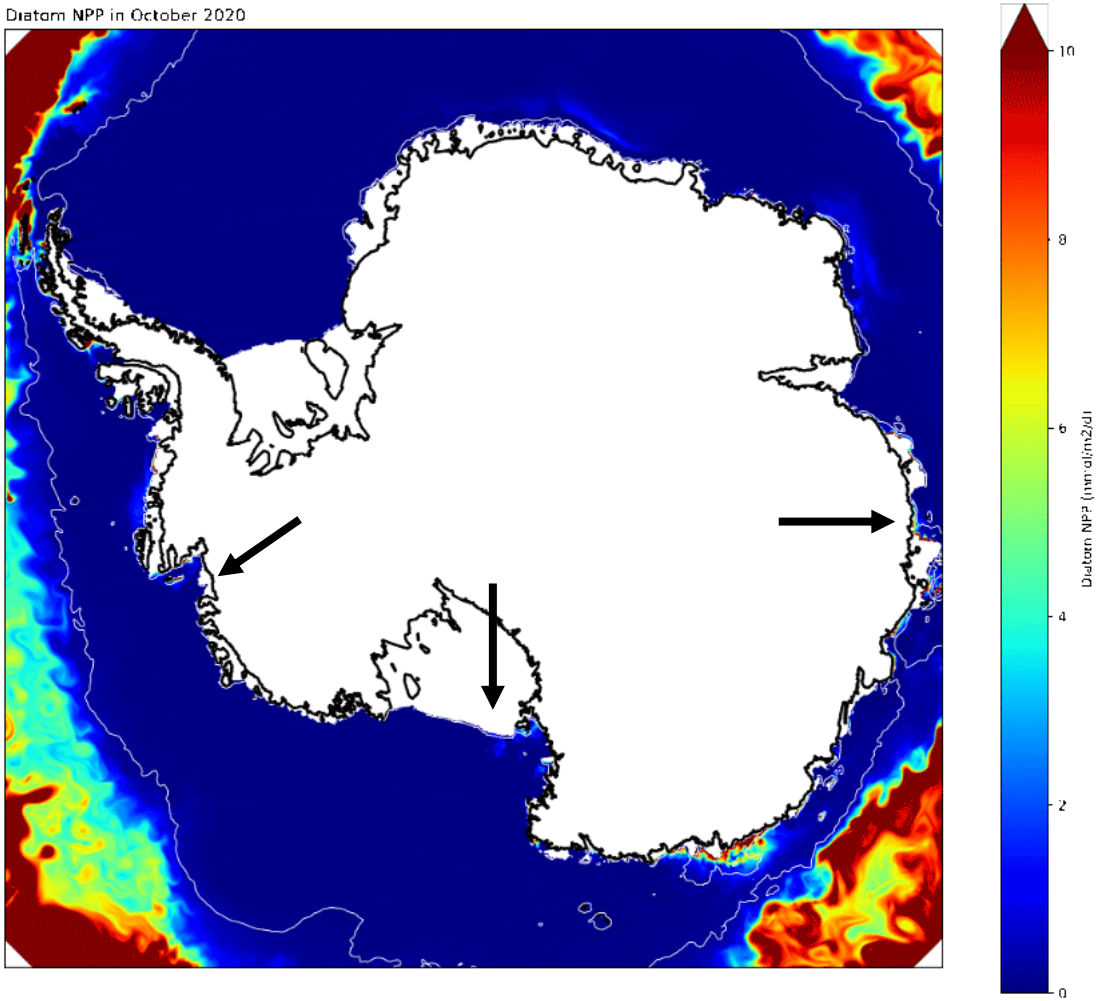
Biological production from Earth System Model projections



Now:

- Processing production from ESM projection data in the linked regions.

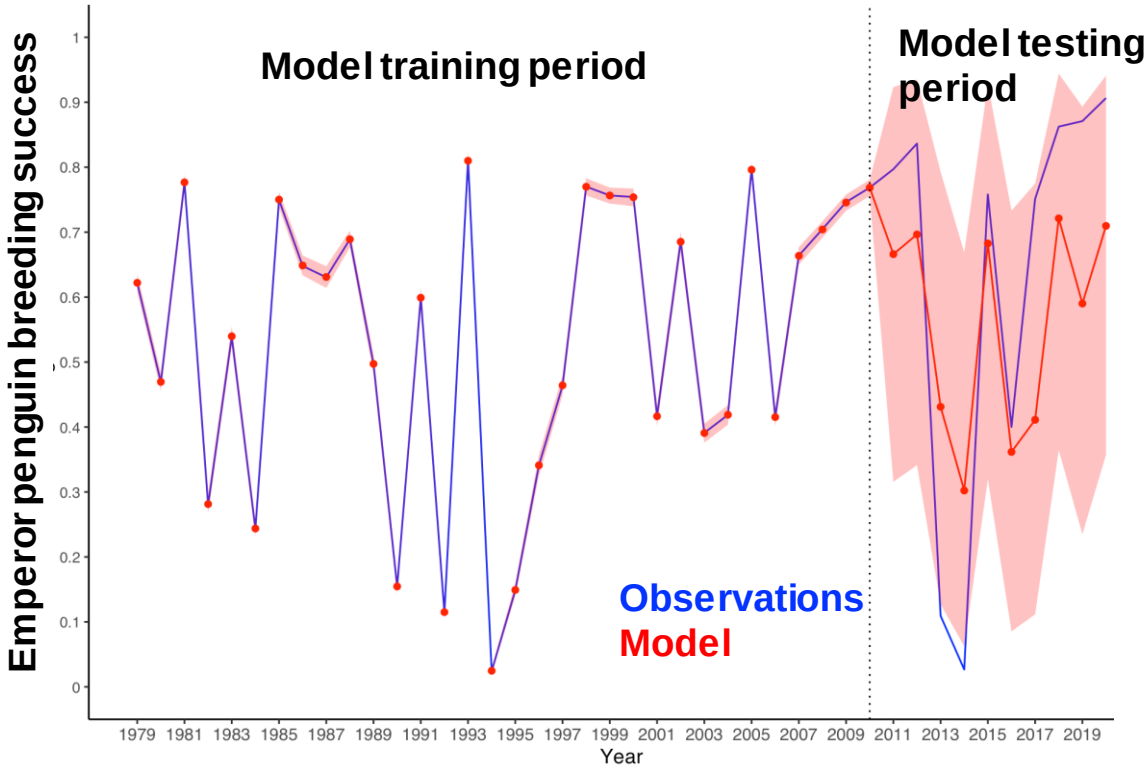


Figures: Kristen Krumhardt

Emperor penguin population dynamics

Done: Using satellite data, found that incorporating distance from penguin colony to open water improves model of breeding success.

Figures: Franceso Ventura



Now: using Earth system model data, including distance to open water, to make projections of penguin populations

Predator habitat use and projections

Done: Used Southern Elephant Seal Tags to measure and predict chlorophyll, including in polynyas

Sara Labrousse

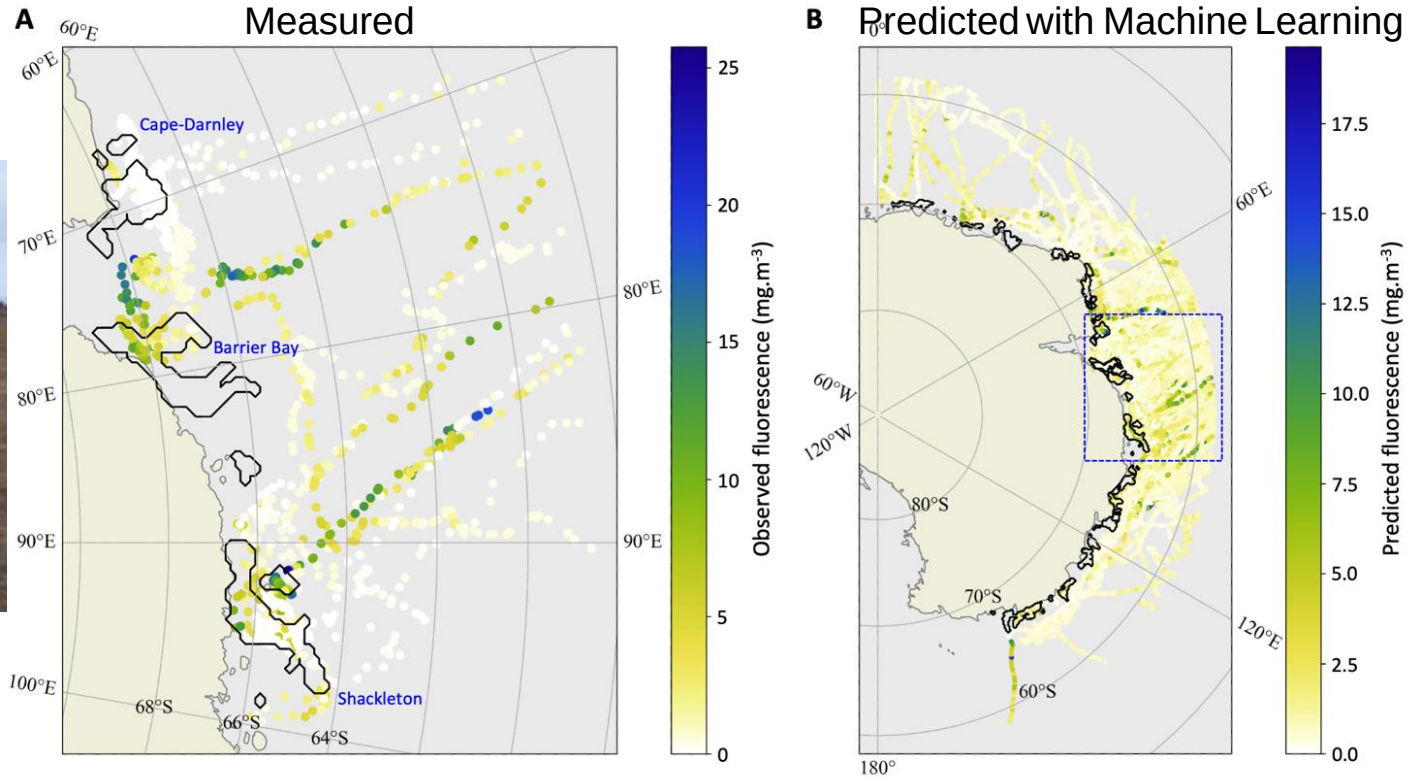


Figure: Lucie Bourreau

Now: using tag data to understand habitat usage and assess polynya residence times.

Thanks for your attention!

Questions?

Alice DuVivier - NCAR

Cassandra Brooks – CU Boulder

Thanks to the entire science team!

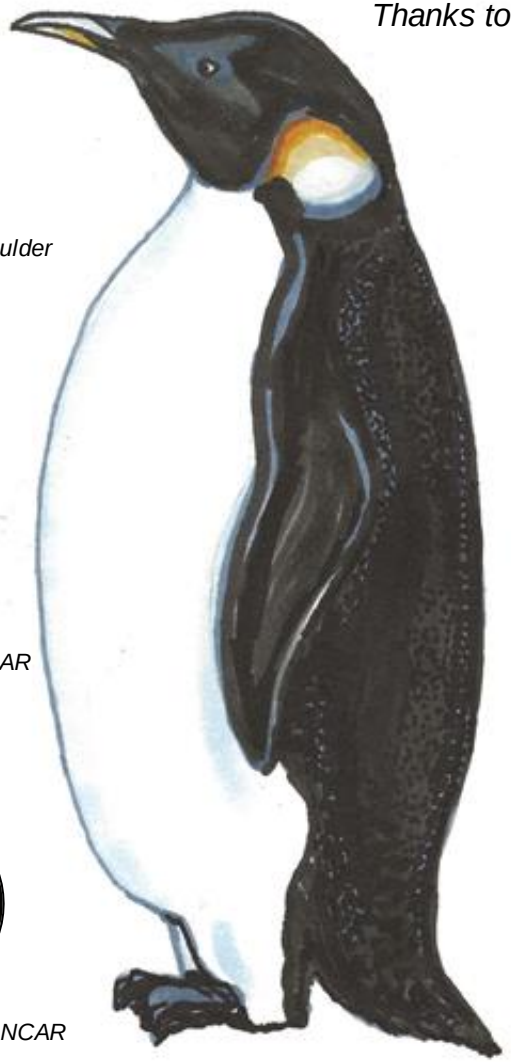


Image: Kristen Krumhardt

Stephanie Jenouvrier – WHOI

Sara Labrousse – L'OCEAN

Zephyr Sylvester – CU Boulder

Laura Landrum - NCAR

Francesco Ventura - WHOI

Marte Vienne – L'OCEAN

Matt Long - NCAR

Kristen Krumhardt - NCAR

Lucie Bourreau – L'OCEAN

Marika Holland - NCAR

Extra slides

What is the impact of polynyas on the Antarctic ecosystem?

Polynya: Area bounded by land or sea ice that has lower sea ice concentration than surrounding region

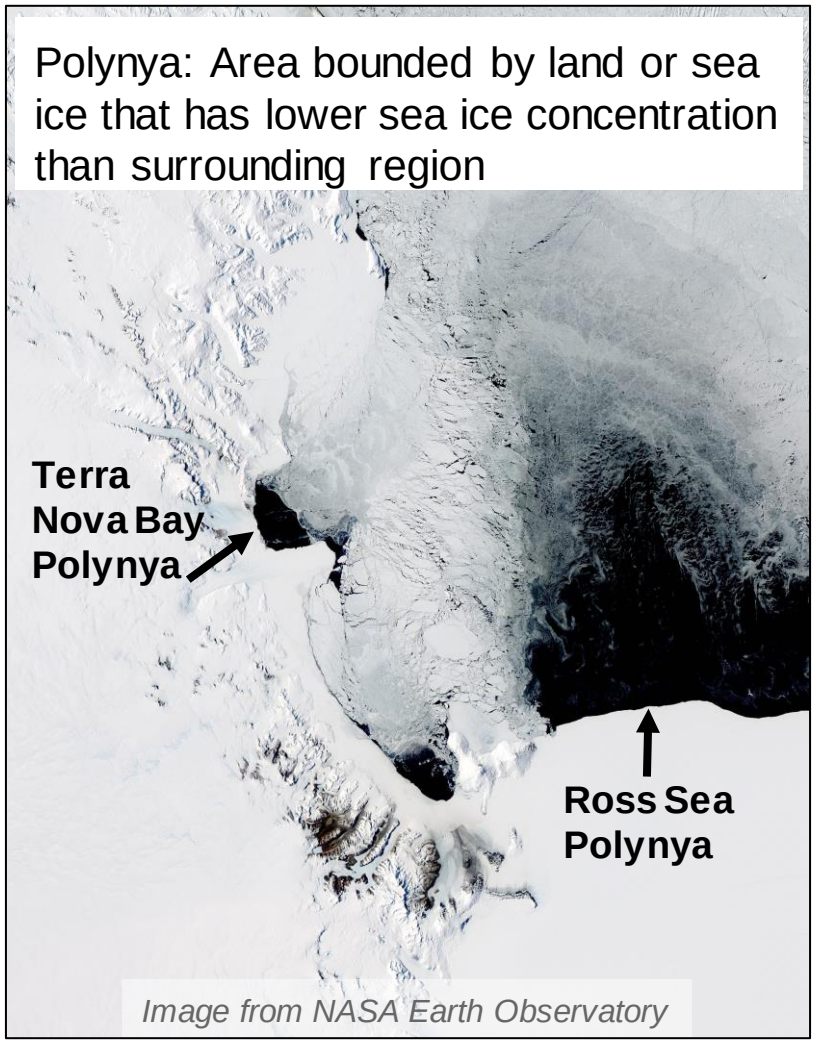


Image from NASA Earth Observatory

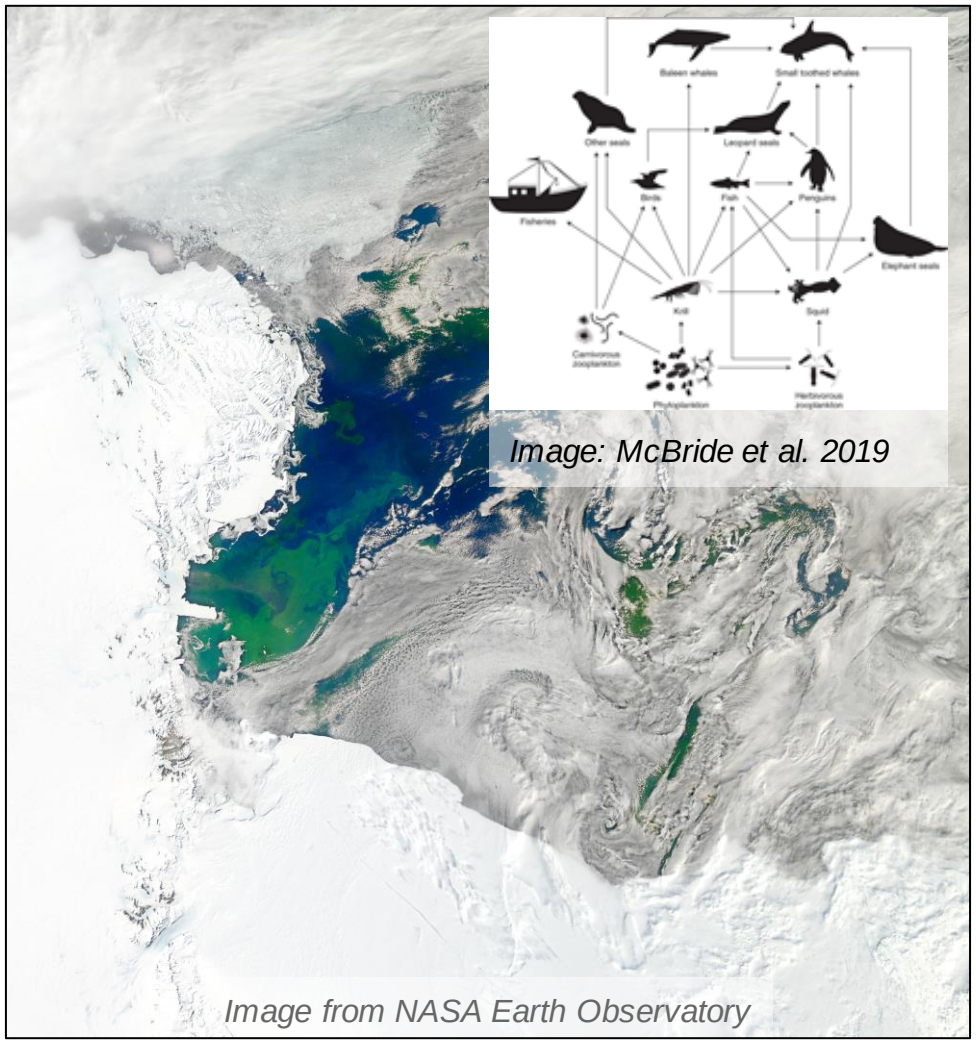


Image: McBride et al. 2019

Image from NASA Earth Observatory

For Maria Kavanaugh

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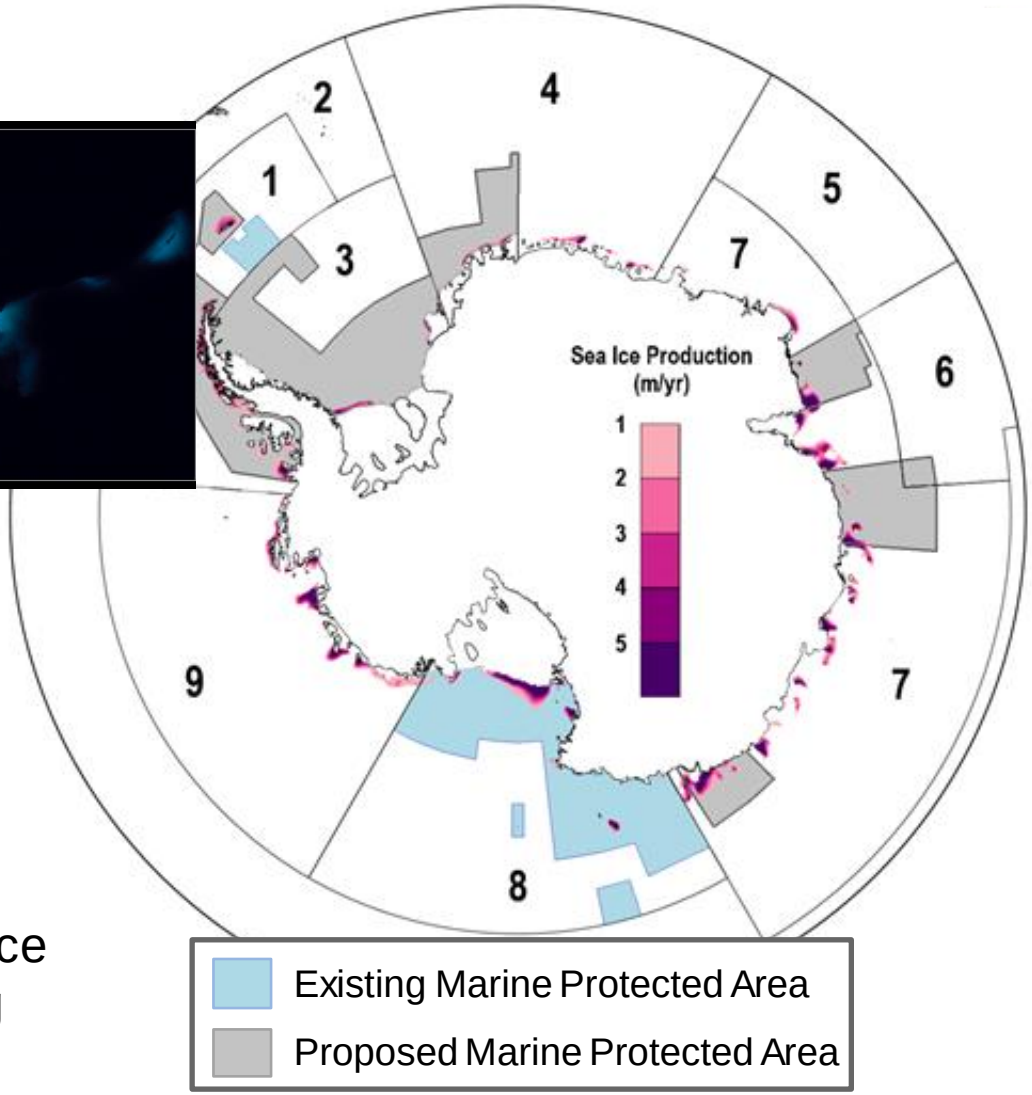
Hot spots in the ice: polynya importance in present and future Antarctic marine ecosystems

Photos: John Weller



Coastal polynya: region of lower sea ice concentration compared to surrounding areas (magenta regions on map).

Hot spots in the ice: Goal: Provide information about the conservation value of polynyas in different Antarctic regions over policy relevant timescales.

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Success requires working across the science-policy-public interface to create a user-friendly website tool and associated media demonstrating how polynya regions that may benefit from protection.